Appendix

Chapter 5: The Effects of Ketamine on reward processing using computational modelling and neuroimaging methods

Table 1. Areas of significant activation in BOLD response for the ketamine group compared to placebo during PILT (whole brain analysis)

	Brain area	**Cluster size (voxels)**		**MNI max (x, y, z)**		***t* score**	***p*-value**
	Group differences, TFCE-corrected FWE cluster significance level of p<0.05						
	Ketamine > placebo						
	Win outcome > loss outcome						
Cluster 1	Left **hippocampus, amygdala**, **frontal orbital cortex**, **putamen,** parahippocampal Gyrus,	371	-36	-18	-14	4.41	0.04
Cluster 2	Angular gyrus, supramarginal gyrus, occipital cortex	350	-52	-68	24	4.14	0.04
Cluster 3	**Anterior cingulate gyrus (ACC),** Paracingulate Gyrus, **caudate**, middle frontal gyrus	338	24	24	8	4.09	0.04
Cluster 4	Parahippocampal Gyrus, Lingual Gyrus Temporal Fusiform Cortex**, Hippocampus, putamen, insular cortex**	334	-30	-38	-10	3.86	0.04
Cluster 5	Inferior Frontal Gyrus, **insular**, central Opercular Cortex, frontal pole, middle frontal gyrus	312	-44	20	14	4.00	0.04
Cluster 6	Precentral gyrus extending into surrounding white matter	138	-18	8	42	3.83	0.04
Cluster 7	**Thalamus**	102	-16	-12	6	4.19	0.04

Cluster 8	Supramarginal Gyrus, Superior Temporal Gyrus, Middle Temporal Gyrus	99	-58	-42	8	4.74	0.04
Cluster 9	Frontal pole	82	28	48	30	4.10	0.04
Cluster 10	Middle Temporal Gyrus	33	-60	-48	-2	3.85	0.04
Cluster 11	White matter	17	26	16	22	3.29	0.05
Cluster 12	Inferior Frontal Gyrus, Frontal pole	14	52	32	6	3.52	0.05
Cluster 13	White matter	11	-38	-50	10	3.81	0.05
Cluster 14	Lingual gyrus, cingulate gyrus with extension into surrounding white matter	11	-26	-54	0	3.29	0.05
Cluster 15	**Insular cortex,** heschl's gyrus (includes H1 and H2), planum Polare	8	-46	-8	0	3.60	0.05
Cluster 16	**Insular**	6	34	10	8	3.65	0.05
Cluster 17	**Frontal pole**	6	14	46	40	3.28	0.05
Cluster 18	**Caudate**	6	12	26	2	3.40	0.05
Cluster 19	White matter	2	-10	22	16	3.86	0.05
Cluster 20	White matter, frontal pole, Inferior Frontal Gyrus	1	46	32	8	2.97	0.05
Cluster 21	Inferior Temporal Gyrus including white matter	1	-52	-56	-8	3.29	0.05
Cluster 22	Supramarginal Gyrus including white matter	1	-52	-30	28	3.93	0.05
Cluster 23	White matter	1	-20	18	34	3.77	0.05

MNI coordinates (x, y, z) refer to the peak of activation within each cluster

Whole-brain clusters showing significant activation for the main effect of task for the outcome valence contrasts. Cluster index, anatomical label, cluster size (voxels), peak MNI coordinates, TFCE value and peak t-statistic. Results are corrected for multiple comparisons (5000 permutations).

Table 2. Areas of significant activation in BOLD response for the ketamine group compared to placebo during PILT (whole brain analysis)

	Brain area	Cluster size (voxels)	MNI max (x, y, z)		*t* score	*p*-value
Group differences, TFCE-corrected FWE cluster significance level of p<0.05						
Placebo > Ketamine						
Loss outcome > no loss outcome						
Cluster 1	Occipital including precuneus	1785	-28	-96	16	3.65	0.02
Cluster 2	**Thalamus** including cingulate gyrus posterior, **caudate**	1239	-14	-10	6	6.05	0.01
Cluster 3	Cingulate gyrus anterior, precentral gyrus, superior frontal gyrus, paracingulate gyrus	1051	4	0	40	4.41	0.03
Cluster 4	Postcentral Gyrus, Superior Parietal Lobule, Supramarginal Gyrus, precuneus, Planum Temporale, Parietal Operculum Cortex	668	-28	-40	60	3.83	0.04
Cluster 5	**ACC, caudate**	375	-26	14	20	3.87	0.04
Cluster 6	Frontal pole	336	26	50	34	5.03	0.02
Cluster 7	**Right putamen including insular**	248	30	-16	8	4.19	0.03
Cluster 8	Cerebellum	246	-4	-86	-32	3.91	0.04
Cluster 9	Occipital Fusiform Gyrus	189	-32	-76	-20	3.87	0.04
Cluster 8	Insular cortex including white matter	187	30	14	24	4.51	0.03
Cluster 10	Frontal Orbital Cortex including hippocampus, and amygdala	173	-24	8	18	3.83	0.04
Cluster 11	Precuneus Cortex	92	-12	-58	42	3.50	0.04
Cluster 12	**Putamen and thalamus** including white matter	83	-30	-30	4	3.69	0.04
Cluster 13	Cerebellum	62	34	-46	-52	5.11	0.04
Cluster 14	Middle Frontal Gyrus, Precentral gyrus	54	46	6	44	4.04	0.04
Cluster 15	**Insular cortex**	43	-40	-18	0	3.34	0.04

Cluster 16	Cerebellum	42	18	-86	-36	3.27	0.05
Cluster 17	Cerebellum	34	-16	-60	-42	3.93	0.04
Cluster 18	Angular gyrus including white matter	33	-34	-42	24	3.64	0.04
Cluster 19	Cerebellum	32	-30	-62	-38	4.23	0.04
Cluster 20	White matter	27	-40	-46	-2	3.61	0.05
Cluster 21	**Hippocampus**	24	-36	-16	-14	3.41	0.05
Cluster 22	White matter	14	28	4	40	3.58	0.05
Cluster 23	Lateral Occipital Cortex	10	18	80	44	2.73	0.05
Cluster 24	Brainstem	9	-8	-14	-14	4.21	0.05
Cluster 25	Inferior Frontal Gyrus	8	48	14	10	3.30	0.05
Cluster 26	White matter	8	20	8	30	3.05	0.05
Cluster 27	White matter	7	-26	6	18	3.99	0.05
Cluster 28	Occipital Cortex	6	44	-76	8	3.07	0.05
Cluster 30	Precentral Gyrus	6	30	-4	46	3.61	0.05
Cluster 31	Temporal Gyrus, white matter	4	52	-20	-16	5.75	0.05
Cluster 32	Occipital Cortex, superior division, Precuneus	2	14	-66	56	3.39	0.05
Cluster 33	Frontal pole, white matter	2	32	34	16	3.13	0.05
Cluster 34	Cerebellum	1	40	-46	-36	4.35	0.05

MNI coordinates (x, y, z) refer to the peak of activation within each cluster

Whole-brain clusters showing significant activation for the main effect of task for the outcome valence contrasts. Cluster index, anatomical label, cluster size (voxels), peak MNI coordinates, TFCE value and peak t-statistic. Results are corrected for multiple comparisons (5000 permutations).